DOCUMENT RESUME

ED 179 755 CE 023 433

AUTHOR Larkin, John: Martin, Barry
TITLE Testing and Evaluation Methods for the Maryland Plan Approach to Industrial Arts.
INSTITUTION Maryland Vocational Curriculum Research and Development Center, College Park.
SPONS AGENCY Maryland Univ., College Park. Dept. of Industrial Education.
PUB DATE 79
NOTE 37p.
AVAILABLE FROM Maryland Vocational Curriculum Production Project, Western Maryland Vocational Resource Center, P.O. Box 5448, McMullen Highway, Cresaptown, Maryland 21502

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS Behavioral Objectives: Guidelines: Guides: Industrial Arts: Observation: Sociometric Techniques: Student Evaluation: *Test Construction: *Testing: Tests

ABSTRACT

Developed specifically to aid teachers who are using or wish to use the Maryland Plan approach to Industrial Arts, this guide offers procedural information on testing and evaluation useful to any teacher interested in evaluating student performance. Focus is on how to develop test items based on instructional objectives: examples are included. Suggestions are given for evaluating student growth in the affective as well as cognitive domains, in line with the Maryland Plan's concern for the development of the whole person. The guide stresses diagnostic procedures to identify strengths and weaknesses in order to plan appropriately for student progress. Main topics covered are (1) building a data collection device: (2) sociometric devices (to furnish information on the classes' social structure and to determine specificity of interpersonal relationships in a class): (3) observational devices (including participation charting, anecdotal records, rating scales, and student self-evaluation): and (4) teacher-made tests (to enable coverage of broad areas of content in a short period of time). (CP)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED179755

Testing and Evaluation Methods for the Maryland Plan Approach to Industrial Arts

John Larkin
Barry Martin

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

1979

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Barry Martin

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

CE 023 433

MARYLAND VCRD

Maryland Vocational Curriculum
Research and Development Center
J.M. Patterson Building University of Maryland
College Park, Maryland 20742

A product disseminated through the:

For additional copies, contact:

The Maryland Vocational Curriculum Production Project
Western Maryland Vocational Resource Center
P. O. Box 5448, McMullen Highway
Cresaptown, Maryland 21502
(301) 777-5886

This publication has been reviewed in compliance with Title IX of the Educational Amendments of 1972 and Public Law 94-482, Title II of the Vocational Education Amendments of 1976 for the elimination of sex bias, sex discrimination, and sex-role stereotyping.

TABLE OF CONTENTS

Acknowledgements i

Introduction ii

Format for Building a Data Collection Device 1

Sociometric Devices. 4

Observational Devices. 12

Participation Charts 12

Anecdotal Records. 17

Rating Scales. 19

Student Self-Evaluation. 22

Teacher Made Tests 25

Multiple Choice Tests. 27

True - False Tests 27

Matching Items 28

Recall tests 29

Selected Bibliography. 31

ACKNOWLEDGEMENTS

The development of this publication is a result of several visits by the authors with teachers using the Maryland Plan approach to Industrial Arts. The visits were valuable in ascertaining the specific needs the Maryland Plan teachers had with regard to testing and evaluation of their students.

Many individuals assisted the writers in their understanding of the needs of the public school teacher, the processes of student measurement and evaluation, and in the understanding of the unique philosophies upon which the evaluation of a Maryland Plan industrial arts pupil should be built.

Special acknowledgement is due the following teachers who provided time in their teaching day to discuss their evaluation needs: Tom Fairfax, Lord Baltimore Junior High School; Robert Eylers, Robert Frost Junior High School; Donald Robinson, James Madison Junior High School; Jack Schondorfer, Francis Scott Key Junior High School; Joseph Sheya and Barry James, Magothy River Middle School.

Appreciation is extended to Dr. Kenneth Stough for reading and commenting on a portion of the material and Bonnie Dunn for typing the manuscript.

The authors are particularly indebted to Dr. Donald Maley who shared his insights into the Maryland Plan, and who spent considerable time with the writers in the development of this presentation.

INTRODUCTION

The uniqueness of the Maryland Plan approach to Industrial Arts is its concern for the development of the whole person. A difficulty that results from this concern is in the testing or evaluation of the educational processes and outcomes of such a program. The contemporary classroom/laboratory teacher is busy with instruction, supervision of laboratory activities, curriculum development or revision, and administrative paperwork. Many of these activities happen during class or laboratory time, thus limiting the time or thoroughness needed to properly test and evaluate the pupils. The purpose of this publication is to assist the teacher:

1. in his or her understanding of the objectives available to the Maryland Plan teacher.
2. in his or her identification of methods used to test or evaluate the development of the Maryland Plan student.
3. in developing a number of testing and evaluation strategies.

This publication deals specifically with a number of testing and evaluating methods which were identified in a review of educational and evaluation literature. These methods were identifed by virtue of their potential for direct application or adaptability to the Maryland Plan approach to Industrial Arts. Whenever possible detailed examples of the sequence for building a data collecting device are presented.

The content of this publication centers around the following headings: Data Collecting Device, Sociometric Devices, Observational Devices, and Teacher Made Tests.

FORMAT FOR BUILDING A DATA COLLECTION DEVICE

The following discussion deals with the use of objectives in the building of measurement devices and specifically the use of Maryland Plan objectives. The objectives are explained in their hierarchical order. The development of measurement questions follows the selection of objectives.

Statements of educational objectives (purposes or goals), in terms of expected pupil outcomes, constitute the single most important element of sound evaluation instruments. The objectives form guidelines for instruction. The publication, THE MARYLAND PLAN: Purposes, Objectives, Observable Behaviors (A Resource Guide for Teachers), Winters, ed., presented objectives for the Maryland Plan. These objectives can be used as a basis for identifying the expected student behaviors. Lack of understanding of these objectives has led teachers to say that one can not evaluate the Maryland Plan Student.

Two types of objectives, as they apply to the Maryland Plan, have been identified by Dressel. He defines one type of objective as being an ultimate objective, while those contributing to the ultimate objective are termed general objectives.

Ultimate objectives refer to behaviors usually not observable under classroom or laboratory conditions. They refer to important goals of education which are difficult to measure objectively. A contributing factor to the inability to directly assess ultimate objectives is that they frequently refer to adult behavior, when the program may be directed towards the teaching of of children and adolescents (Dressel, pp. 1-6).

General objectives are developed to further explain the ultimate objective. The general objective is not as broad as an ultimate objective; however, it does not deal with specific student behaviors. It is the immediate objective which identify single student behaviors. Immediate objectives, also referred to in this writing as observable behaviors, are specific enough as to enable the test builder to develop test questions.

The hierarchy of objectives is as follows:

I. Ultimate Objective

A. General Objective/s

1. Immediate (Observable) Objective/s

a. Test Item Areas

Test items or evaluative instruments are devised with the immediate objectives as the principle focus. The understanding and use of this objective or observable behavior identification technique is the key to measurement and evaluation for the Maryland Plan.

A number of the ultimate, general, and immediate objectives are listed in Purposes, Objectives, Observable Behaviors (A Resource Guide for Teachers). A sample breakdown of one set of objectives found on page fourteen is presented in the hierarchical format.

Ultimate Objective

I. The student will develop an understanding of industry and technology.

General Objective

A. The student will understand the personnel organization in the management of industry.

Immediate Objective (Observable)

1. The student constructs a line and staff personnel organization chart.

2. The student interprets the corporate organization of an industry.

NEXT SECTION:
Sociometric Devices

SOCIOMETRIC DEVICES

One of the major propositions set forth in The Maryland Plan is that Industrial Arts provides a setting for "an involvement of people in a living-learning situation that closely approximates life" (Maley, p. 6). Sociometry, therefore, becomes an important tool in the collection of data concerning social growth of the Maryland Plan student.

Sociometric devices are useful when collecting data concerning student growth in social situations. A teacher can obtain objective information relative to the social structure of his or her classes (Musgrave, p. 58). The teacher can further determine the specificity of interpersonal relationships in a class, identify which student may require individual observation, and assist in individual and class social development (Payne, p. 32; Bonney, Hampleman, p. 60-61).

The sociogram is an instrument used in sociometric data collection that is frequently cited in educational evaluation literature. Constructing a sociogram may be accomplished with certain objectives found in THE MARYLAND PLAN: Purposes, Objectives, Observable Behaviors (A Resource Guide For Teachers). Specific social behaviors may be quantified by using this instrumentation.

Developing a sociogram begins with the identification of objectives. The sequence is to first identify the ultimate objective, identify the general objective second, and finally, identify an immediate objective. A sociometric question

concerning an interpersonal relationship or social aspiration of the student is developed with regard to the identified immediate objective. Data is tabulated, as in Figures 3 and 5, after the students have responded to the sociometric question. A step-by-step procedure is presented in the following examples.

The first examples presented the development of a sociometric question. The sociogram example as developed using objectives found in THE MARYLAND PLAN: Purposes, Objectives, Observable Behaviors (A Resource Guide for Teachers) continues through the development of sociometric questions asked each student. Figure 1 illustrates the sequence in choosing objectives leading to the sociometric question.

Figure 1

EXAMPLES OF IDENTIFYING TYPES OF OBJECTIVES

ULTIMATE OBJECTIVE	Skill Development (p. 21)
GENERAL OBJECTIVE	The student develops desirable social relationships (p. 22)
IMMEDIATE OBJECTIVE (observable behaviors) . . .	assists other students and accepts their assistance in class activities (p. 23)

The above example depicts the level of each of the three objectives which will be used to develop a series of sociometric questions.

Figure 2 illustrates four sociometric questions developed from three immediate objectives.

Figure 2

EXAMPLES ILLUSTRATING THE DEVELOPMENT OF SOCIOMETRIC QUESTIONS

IMMEDIATE OBJECTIVE	SOCIOMETRIC QUESTIONS
. . . assists other students and accepts their assistance in class activities (p. 23).	1. Name two classmates who you think would assist you in your work if it were evident you required help? 2. Name two classmates who you think would readily accept your assistance if you could be helpful to him or her?
. . . works well with others (p. 22).	3. Name two classmates who you think work best with others in the class?
. . . enters into new and different social situations (p.23).	4. Name two classmates with whom you are now friends who were not your friends before this class?

The development of a sociometric question takes place when the test builder selects an immediate objective and puts it in question form. The first immediate objective in Figure 2 enabled the formation of two questions, each asking for specific information.

The response data for a given sociometric question is tabulated on a chart which has the students' names listed horizontally where each student's choice of other students is scored, and vertically where the number of times each student has been chosen by other students can be counted. A second example is provided for the reader in Figure 3.

Figure 3

SOCIOMETRIC DATA MATRIX FOR TABULATING THE RESULTS TO THE QUESTION: Name two classmates who you think would assist you in your work if it were evident you required help.

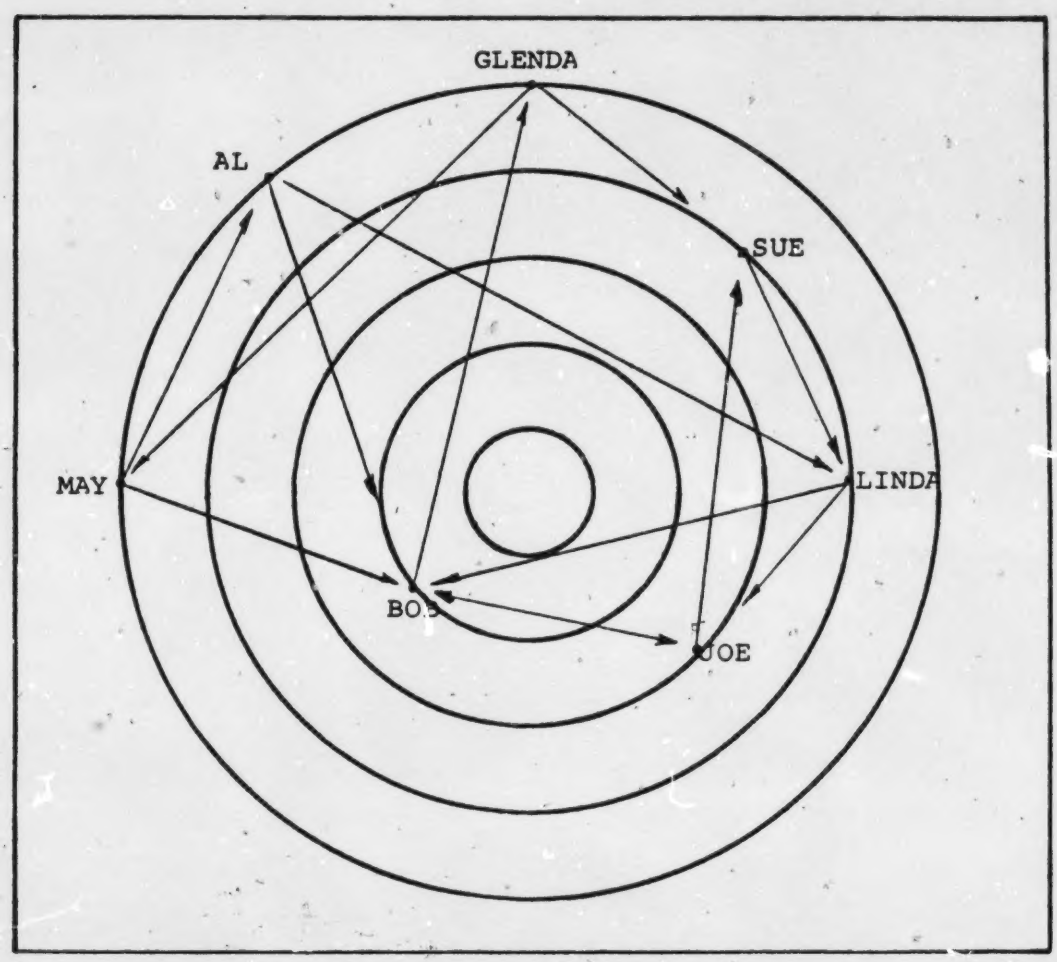
	May	Al	Sue	Joe	Glenda	Bob	Linda
Linda				X		X	
Bob				X	X		
Glenda	X		X				
Joe			X			X	
Sue							X
Al						X	X
May		X				X	

A sociometric question is developed (above) and asked of the students. The vertical list of names are the choosers, the horizontal list of the same names are the chosen. In the example above, Linda would expect assistance from Joe and Bob. Tabulating the number of times a name is chosen shows that Bob is expected by four of the seven students to offer assistance, while May is only seen by one student as offering aid without a request.

The sociogram, shown in Figure 4, is comprised of a group of concentric circles where the individuals with the highest scores are placed towards the inner circle. It is a result of the data collected by the sociometric matrix. Students accumulating the lowest scores are placed in the outer circle. Arrows are used to show how each student reacted to the other students.

Figure 4

SOCIOMETRIC TARGET ILLUSTRATING THE DATA COLLECTED BY THE SOCIOMETRIC MATRIX RESULTING FROM THE QUESTION: Name two classmates who you think would assist you in your work if it were evident you required help.



The sociometric target is set up in a variety of ways; however, the outer circle usually reflects one choice and the inner circle reflects the higher number of choices. In the example, Glenda is shown choosing Sue, who was also chosen by Joe. Glenda was chosen only once by Bob.

The sociometric choice matrix shown in Figure 5 is used to record the responses of each student. The students were asked to select two students that work best with others in the class. They were also asked to indicate their first and second choice.

Figure 5

SOCIOMETRIC CHOICE MATRIX FOR TABULATING THE RESULTS TO THE QUESTION: Name two classmates who you think work best with others in the class.

CHOOSERS	allen	gary	george	peter	timmy	david	ken	scott	joe	mary	sharon	sue	
ALLEN		1					2						
GARY				2	1								
GEORGE				2		1							
PETER			1		2								
TIMMY		2				1							
DAVID			1							2			
KEN						2				1			
SCOTT									2			1	
JOE								1				2	
MARY						1					2		
SHARON		2					1						
SUE								2	1				
1st choice	0	1	2	0	1	3	1	1	1	1	0	1	
2d choice	0	2	0	2	1	1	1	1	1	1	1	1	
Times Chosen	0	3	2	2	2	4	2	2	2	2	1	2	
SCORE	0	4	4	2	3	7	3	3	3	3	1	3	

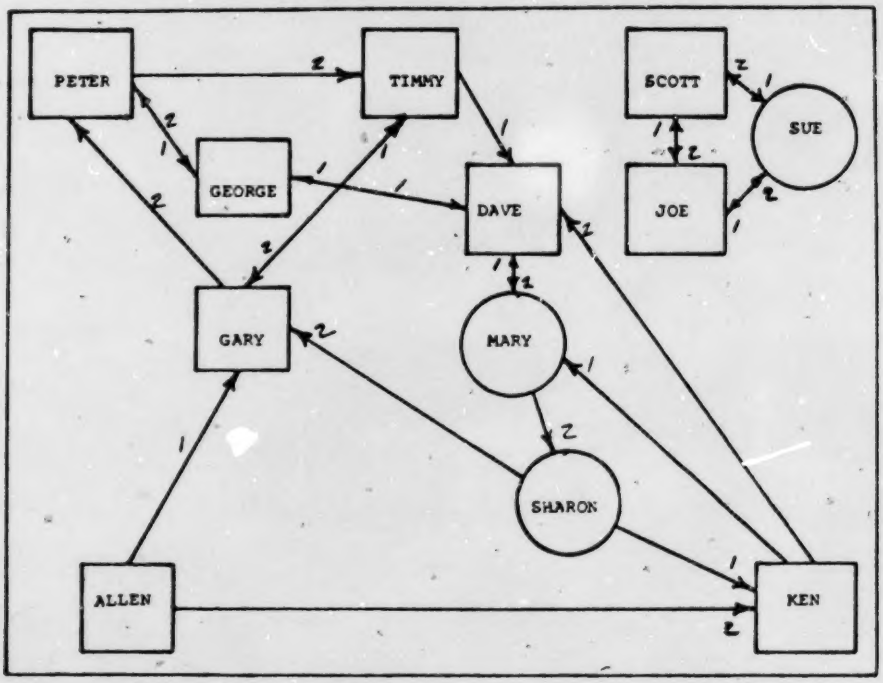
The sociometric choice matrix shows the choosers in the vertical column, name capitalized; the chosen in the horizontal

column in lower case. The tabulation on the bottom shows David chosen first three out of four times. Earning two points for being chosen first and one point for being a second choice, David's score is 7. The points earned by Sharon, Peter, and Allen, prove them to be lacking some social skill in the view of their peers.

Figure 6 is an example of how the data from the sociometric choice matrix may be further illustrated using a sociogram gender/choice diagram. Two lines are drawn from each student to the two students they have selected. A number 1 or 2 is placed near the arrow indicating whether the selection was a first or second choice.

Figure 6

SOCIOGRAM GENDER/CHOICE DIAGRAM, USED TO ILLUSTRATE THE RESULTS OF THE SOCIOMETRIC CHOICE MATRIX



Dave was selected by Timmy, George, and Mary as their first choice and by Ken as his second choice. Dave selected George as his first choice and Mary as his second choice. Squares are used for boys and circles for girls to assist in a quick visual interpretation. The diagram shows that the class doesn't see Allen as a helpful student. The teacher could devise a situation to change this behavior.

Objective data concerning the social aspects of a class can be obtained through the use of sociometry. There is no suggested time frame for any sociometric testing. Changing dynamics of social structures do not allow for an optimal instance where data is to be collected. The teacher must rely on his or her own judgement to determine when a sociogram will provide information which would assist them in remaining current with the implications of the data (Bonney, Hampleman, p. 69).

OBSERVATIONAL DEVICES

Observational devices are instruments which yield qualitative and quantitative data concerning student social behaviors. There are many approaches to making an observation. The approaches range from: teacher constructed participation charts (Lien), anecdotal records, checklists, rating scales, casual observations, situational observations (Bonney, Hampleman), to sophisticated observational approaches using audio-taping, video-taping, and movie making (Bonney, Hampleman). Instances where the observational instruments are more appropriate than the objective type instruments can be determined by the teacher who understands the significance of the information which may be obtained by using observational techniques.

The major advantage of observational tools is that they have wide applicability. Observation of students may provide the best means available for evaluation concerning a variety of social behaviors for which no precise measuring technique is available (Bonney, Hampleman). The four forms which may yield the data required by the classroom teacher who may want to take observations as part of his/her overall student evaluation are presented in the following sections with respect to the Maryland Plan approach to Industrial Arts.

Participation Charting

A participation chart is used for observing which students contribute to the given task, how often she/he contributes, and the value of the contributions (Lien, p. 94-97). Evidence can be collected concerning the progress of each student toward course

objectives by charting voluntary student participation.

The participation chart can be used for measuring quantity and quality of student involvement in a variety of observable situations.

The Maryland Plan objectives supporting the observable behavior have been referred to as a basis for developing evaluation instrumentation. Objectives used in the following example of participation charting have been selected from THE MARYLAND PLAN: Purposes, Objectives, Observable Behaviors (A Resource Guide for Teachers).

Figure 7 illustrates the sequence in choosing objectives leading to the participation chart question.

Figure 7

EXAMPLE OF IDENTIFYING TYPES OF OBJECTIVES

ULTIMATE OBJECTIVE	Self Exploration (p. 5)
GENERAL OBJECTIVE	The student develops social and leadership capabilities (p. 6)
IMMEDIATE OBJECTIVE (observable behaviors) . . .	challenges other students appropriately (p. 7)

The above example depicts the level of each of the three objectives which will be used to develop a series of questions for chart construction.

Figure 8 illustrates three questions developed from the immediate objectives on which a participation chart can be based.

Figure 8

IMMEDIATE OBJECTIVES AND RESULTING QUESTIONS USED FOR CHART CONSTRUCTION

Immediate Objectives	Participation Questions
. . . challenges other students appropriately (p. 7)	1. How often does any given student use appropriate social form in the questioning of a fellow student?
. . . initiates questions in class voluntarily (p. 7)	2. How often does any given student support class discussion or activities by asking questions without the prompting of the teacher?
. . . offers constructive suggestions (p. 7)	3. How often does any given student participate in class activities by offering suggestions in order to further the class' task?

The development of a question to be used for chart construction takes place when the chart builder selects an immediate objective and puts it in question form.

Several charts may be developed and data collected over the time of a marking period which will yield evaluative information on student social behaviors in class. An example of a partial participation chart is presented in Figure 9 to assist the reader in understanding this form of observational device. The chart was developed using participation question number 3.

Figure 9

EXAMPLE OF A PARTICIPATION CHART USED TO RECORD ACTIVITIES IN RESPECT TO THE QUESTION: How often (and at what level) does a given student participate in class activities by offering suggestions in order to further the class's tasks?

Participation in Planning Session #1 of the Group Project Unit

Type of Contribution *	John	Barry	Mike	Joe	Helen
Superior	||	||		|	
Secondary	||	||	|	|||	|
Uncertain or Doubtful	|	|		||	
Detracting	|		||		|

* Type of contribution defined.
Superior: Introduction of significant idea.
Secondary: Introduction of important, but minor idea.
Uncertain: Contribution needs classification.
Detracting: Contribution detracts from discussion.
(Note: The chart also rates the quality of the participation.)

The participation in the first planning session of the Group Project Unit is shown by the chart to be mediocre in quality and student interaction. This chart becomes more valuable when subsequent charts are compared to it. The teacher should monitor the participation of Helen and Mike and assist in involving them more. Planning sessions which follow should show increased understanding of the topic being studied as the quality of participation increases in numbers as well as in significance of each contribution.

Charting general class discussion is a somewhat more difficult task because it takes the teacher's attention away from the discussion momentarily. A procedure which overcomes this is to chart participation as soon after the discussion as possible. Rating each student once or twice during a week and analyzing their participation during the grading period is another method used by some teachers (Lien, p. 96).

Figure 10 illustrates another type of participation chart. The chart was developed using question number 2.

Figure 10

EXAMPLES OF A QUALITATIVE PARTICIPATION CHART USED TO RECORD THE CONTRIBUTIONS TO THE QUESTION: How often does any given student support class discussion or activiites by asking questions without the prompting of the teacher? Further, what is their significance to the class activities?

2. How often does any given student support class discussion or activities by asking questions without the prompting of the teacher? Further, what is their significance to the class activities?

(Note: the chart also rates the quantity of the participation

Name	Participation in Seminar Number: 1	2	3	4
Jack Avery	3, 3, 2,	3, 2, 2,	2, 2,	3, 3,
Rob Baker	2, 1,	3, 2, 3,	2,	2, 2, 3,
Ken Crowley	2, 3, 2,	2, 2, 1,	3, 2, 3,	2, 3, 2,
Dave Doyle	3, 1,	2,	1,	2, 2,

Where:

3 = superior contribution
2 = secondary contribution
1 = uncertain contribution
0 = detracting contribution

The participation chart tends to indicate that Jack Avery and Ken Crowley were well prepared for the seminar and made valuable contributions. Rob Baker was prepared on two of the four seminars. Dave Doyle either was ill-prepared or was not paying attention to the seminar discussion.

Participation charts can be used for both quantitative and qualitative involvement on the part of the student. They can be used to chart the number of times a student exhibits a behavior as well as the quality of the behavior.

Charting the observable classroom/laboratory participation of students will allow the teacher to objectively evaluate the progress of students towards the course objectives. Follow-ups with individual students may be useful to both the teacher and the student when constructive actions are taken to promote acceptable social contributions to a group.

Anecdotal Records

An anecdotal record is a written observation of a single, specific incident of student behavior. The anecdotal record is a teacher's description of factual records rather than interpretations of what happened.

Anecdotal records may be used when a teacher is interested in recording specific behaviors to which he/she can later apply motivation and educational objectives. The teacher may reflect on the incident and suggest either remedial or reinforcing actions. This procedure allows the teacher to follow-up a given situation.

Figure 11

EXAMPLE OF IDENTIFYING TYPES OF OBJECTIVES

ULTIMATE OBJECTIVE	Self Exploration
GENERAL OBJECTIVE . . .	The student develops a feeling that he has a contribution to make.
IMMEDIATE OBJECTIVE (observable behaviors) . . .	The student voluntarily contributes to class activities and goals.

The sample ultimate objective used in this situation was not listed in the Maryland Plan Resource Guide. This is an example which has been identified as relevant to a given class situation and is an additional observable behavior that could be used to evaluate the objectives of the program.

Figure 12 is an example of anecdotal recording. This record may be printed on an index card or on slips of paper.

Figure 12

EXAMPLE OF ANECDOTAL RECORD MADE DURING A ROLE PLAYING ACTIVITY IN THE LINE PRODUCTION UNIT. John Green is the Educational Director.

Name: John Green Grade: Eighth Date: 7-7-77

Incident: John volunteered to make arrangements for a guest speaker. The speaker will talk to the class concerning personnel systems in industry.

Comment: This is the first time John has identified with the group and its goals. This is his first contribution to the class activities. This may be the spark that will allow him to identify more closely with the group and its activities.

Recommendation for teacher action: Must acknowledge John's extra efforts during one of the seminars. Encourage other students to also acknowledge John's contribution.

John Green was observed making arrangements for a guest speaker in response to obligations to his role as Educational Director. The teacher recorded the initial feelings towards the incident for the record and later retrieval. The teacher further made a recommendation for reinforcing the positive student behavior.

Rating Scales

Rating scales are used to indicate the status of an individual on a series of traits by means of checking the extent or degree to which the pupil has developed a specific characteristic. The rating scale is generally used when the teacher feels it is necessary to obtain finer discrimination among students than a checklist allows. When using a checklist, the trait is either present or absent; on a rating scale, it is assumed that all pupils will exhibit some growth toward a trait, but the growth will be in varying degrees. Specifically, the rating scale assists the teacher in measuring the more intangible characteristics of students such as attitudes, appreciations, or skills that can be evaluated only in a limited way using objective measures.

Rating scales are developed much like checklists except that the trait or characteristic to be observed must be defined. The degrees of growth also must be identified and observable.

Class discussions and planning sessions are used extensively

with all phases of the Maryland Plan. A major emphasis is placed on class planning sessions in the Group Project and the Line Production Approaches. These planning sessions present numerous opportunities for students to use and enhance their communication skills. A rating scale can assist the teacher in evaluating each student's contribution to the planning sessions.

The sample objectives utilized to show how rating scales may be used to record student contributions in planning sessions are shown in Figure 13.

Figure 13

EXAMPLE OF IDENTIFYING TYPES OF OBJECTIVES

ULTIMATE OBJECTIVE	Self Exploration (p. 17)
GENERAL OBJECTIVE	The student develops leadership and followship abilities (p. 17).
IMMEDIATE OBJECTIVE (observable behaviors) . . .	assists students in the solution of problems.
. . .	participates in class discussions.
. . .	contributes ideas and suggestions in group situations (p. 17)

The above example depicts the level of each of the three objectives which will be used in the construction of a rating scale.

Examples of rating scale questions pertaining to selected immediate objectives are presented in Figure 14.

Figure 14

EXAMPLES ILLUSTRATING THE DEVELOPMENT OF RATING SCALE QUESTIONS

Immediate Objectives	Rating Scale Questions
. . . assists students in the solution of problems.	1. How responsible is the student in assisting his/her classmates in the solution of problems?
. . . participates in class discussions.	2. How effectively did the student participate in discussion of a project for the line production unit?
. . . contributes ideas and suggestions in group situations.	3. How often does the student become verbal in an acceptable manner in group activities?

An example of a rating scale is shown in Figure 15.

Figure 15

SCALE FOR RATING STUDENTS

The scale is developed from the question concerning participation in a participating group discussion:

2. How effectively did the student participate in discussion of a project for the line production unit?

1	2	3	4	5
Did not enter the discussion	Entered only when asked to participate	Enters the discussion with little enthusiasm	Attempted to offer several ideas	Participates in a discussion with significant material

Figure 16 presents another example of a rating scale that can be used to evaluate the question concerning the quality of a students participation.

Figure 16

SCALE FOR RATING STUDENTS

Question 3. Did the student participate effectively in group project planning activities?

1	2	3	4	5
His ideas detracted group from goal	Was passive, usually agreed with majority	Occasionally participates with ideas of secondary importance	Occasionally participates with ideas of value	Participates with ideas of major importance

The numbers assigned to each of the various levels are useful in arriving at a score for each student should the teacher elect to use them.

Student Self-Evaluation

An essential facet of evaluation in today's schools is student self-evaluation. Through such evaluation, students appraise their own skills, attitudes, beliefs, needs, behavior and progress in achieving their goals. Evidence of progress, strengths, and weaknesses can be diagnosed by the student in this cooperative effort. This instructional technique allows students to gain an

insight into their capabilities and accomplishments.

There are many opportunities where students can evaluate their own work either in completed form or as it is progressing. If the students know beforehand what specific criteria or specifications their work will be subjected to, they can check their assignments periodically or before submitting them to their teacher.

Students are motivated to improve when they learn of their competencies and recognize that progress is being accomplished. Some of the many self-evaluation devices that may be used include: diaries, graphs, work samples, profiles, activity records, logs, and conferences (Jarolimek, Chapter 17).

Classes may work out evaluation sheets cooperatively and apply them to their work individually. The format will vary with the project, report or assignment.

Figure 17 illustrates a self-evaluation form that could be used with the Maryland Plan. It would allow the students to assess their capabilities in meeting the following objectives:

ULTIMATE OBJECTIVE	Self-Exploration (p. 5)
GENERAL OBJECTIVE	The student develops social and leadership capabilities (p. 6)

The self-evaluation format shown in Figure 17 was adapted from Jarolimek (p. 491). The observable behaviors are used to evaluate the student progress in meeting the ultimate and general objectives mentioned.

Figure 17

EXAMPLE OF SELF-EVALUATION FORM

Date:_____ Name:_____

1. Outstanding
2. Above average
3. Satisfactory
4. Needs improvement

	(Week)					
	1	2	3	4	5	6
1. I organized a seminar.		4				
2. I lead a seminar.			2			
3. I accepted criticism and suggestions.	2	3			1	
4. I challenged fellow students appropriately.			2	2		2
5. I helped fellow students clarify their problems.	3		2		3	
6. I lead a discussion.		3		2		
7. I worked cooperatively with my fellow classmates.			1		1	
8. I engaged in new and involved peer relationships.		2		2		2
9. I recognized contributions made by other classmates.			3		3	
10. I offered constructive suggestions to class discussions.		2		2		

The student indicates his/her level of involvement in terms of the social and leadership capabilities listed. This procedure carried out weekly indicates the progress made and areas where emphasis are needed. The blank spaces don't necessarily mean that the student is deficient in these areas.

NEXT SECTION:
Teacher Made Tests

TEACHER MADE TESTS

Teacher made tests are objective devices used to measure the recall of knowledges and more complex cognitive abilities (Payne, p. 36). These types of tests enable the teacher to cover broad areas of content in a short period of time. A teacher built test consists of several questions each of which has a number of possible responses (except when a student may be asked to recall information).

One of the first steps in the development of a test is to establish the objectives and content areas to be included. The test outline is developed out of these objectives and areas. It also includes some indication of the extent of coverage by the identification of the number of questions in each area. A sample test outline is shown in Figure 18.

The following specifications for a test to be given as a result of a group project is evolved from the Maryland Plan objectives. The format is as follows:

Ultimate objective	- -	Understanding the nature of industry and technology.
General objective	- -	Student understands organization of management.
Immediate objective	- -	Discusses elements of the organization.
Test item areas	- -	Requirements of a given role or job.

Nine areas will be covered by the test to be built. The test will accomplish this in twenty-five questions, which will take a short time for test taking, yet it will be reliable in its measure of the students' knowledge.

Figure 18

BROAD TEST OUTLINE FOR A TEST ON THE GROUP PROJECT

Areas to be Covered	Number of Questions
a. general	5
b. societal contribution of the industry	3
c. materials used by the industry	3
d. processes used by the industry	3
e. requirements of given roles	5
f. safety concerns of the industry	3
g. environmental concerns of the industry	3
h. construction aspects of the actual project	3
i. other	2
Total items on test	25

A detailed breakdown of area "e" is offered in Figure 19 so the reader may see how five questions can be developed.

Figure 19

DETAILED BREAKDOWN OF AREA "e", REQUIREMENTS OF GIVEN ROLES

e. requirements of given roles
   (1) line and staff relationships (2 questions).
   (2) major activities of given roles (2 questions).
   (3) requirements for employment in given roles (1 question).

(Note: This format was taken from Micheels and Karnes (pg. 98) and fitted to a table of specifications as might be used in the Maryland Plan Group Project.)

The fifth area of the test, requirements of given roles, will yield five questions. The teacher will be assured that the

area was thoroughly tested.

Teacher made tests fall into several categories. The four forms of objective tests favored by classroom teachers are Multiple Choice, True-False, and Recall tests.

Multiple Choice Tests

The multiple choice test is valuable in its use to measure students' ability to interpret, discriminate, select, and apply things learned (Micheels and Karnes, pp. 174-175).

A multiple choice test item consists of a question or an incomplete statement followed by four or five possible answers. This type of test may take on many forms with respect to the nature of the response.

One Right Answer -
Best Answer -
Matching Type -
Reverse Multiple Choice -
Analogy Multiple Choice -

One example of a variation of a multiple choice question that may be appropriate with the Maryland Plan is presented below.

Anthropological Unit Multiple Choice Item: (one right answer).

(X) One of the two "iron clad" ships to be used in battle during the Civil War was named the _____.

a. Marquett
b. Merchant
c. Minniford
d. Monitor
e. Myron

True-False Tests

The popularity of the true-false test is due to the short time it requries students to take it. A larger selection and

more test items may be asked because of the time factor. Scoring is also fast as well as objective. The test can be used as a daily short quiz to inspire motivation for a new assignment, to review a previous lesson, or to locate points to be retaught (Micheels and Karnes, pg. 209).

The true-false items consist of a declarative statement or a situation that is either true or false. There are several variations of the true-false test.

Regular (Unmodified) True-False -
Cluster True-False -
Modified True-False -

One example of a true-false question that may be appropriate to use with the Maryland Plan is presented below.

Anthropological Unit True-False Item: (regular).

T F (X) The "crane" was developed by several nations prior to the claim made by the Romans stating that they were the first to use it to lift heavy objects.

Matching Items Tests

Matching tests are relatively easy to construct and yet they can be made totally objective and be easily scored. Matching tests can be used to match such things as:

Terms to Definitions -
Problems to Solutions -
Same Item Definition -
Identification Objects -
Symbols to Their Names -
Classification Objects -
Problems With Their Solutions -

Matching items requires the matching of two or more sets of information. The student is required to match items or statements from one list with items or statements in another list. There are several variations of the matching item procedure.

One example of a variation of matching items questions as may occur in the Maryland Plan is as follows:

Industrial Arts Matching Test Question: (identification).

(X)____	shank	a. glasses
____	set	b. hammer
____	peen	c. screwdr.ver
____	bit	d. file
____	torque	e. square
____	safety	f. saw
		g. drill
		h. wrench

Recall Testing

The recall item measures retention of specific points and requires accurate information. It is an easy method for building a test, yet it can be used to measure the who, what, why, where as well as to measure mathematical computations, uses of formulas, and uses of measuring instruments. This method of testing also samples a wide range of subject matter in a short period of time.

When taking the recall form of test, the student supplies the answer. The answer may range from a single word to an incomplete statement, or the student may be asked to complete a sketch or picture. There are several forms of this test building method.

Examples of variations in recall items are presented as follows:

Item for the Anthropological Unit: (sentence completion).

X. _____ developed the D.C. form of electricity?

Item for the Group Project: (listing or enumeration)

X. List five line positions used in your company.

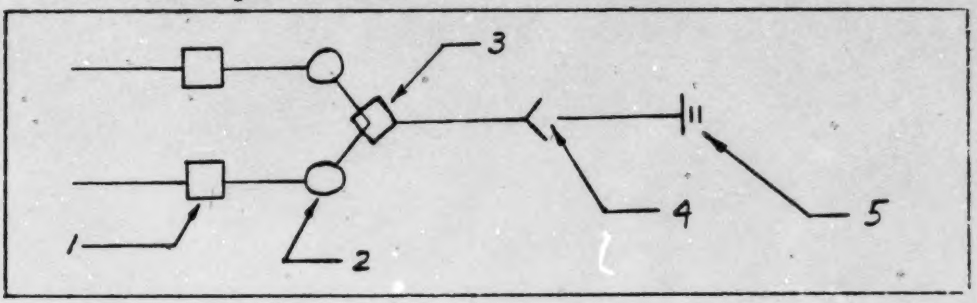
1. _____ 4. _____

2. _____ 5. _____

3. _____

Item for the Line Production Unit: (identification).

X. Give the name for the positions numbered on the production flow chart given below.



1. _____ 4. _____

2. _____ 5. _____

3. _____

The four methods for building a teacher made test as given in the examples above provide the Maryland Plan teacher with the potential to collect relevant data in many areas of content in the shortest possible time.

Selected Bibliography

Ahmann, J. Stanley and Glock, Marrin D. Measuring and Evaluating Educational Achievement. Boston: Allyn and Bacon, Inc., 1971.

Baron, Denis and Bernard, Harold W. Evaluation Techniques for Classroom Teachers. New York: McGraw-Hill Book Company, Inc., 1958.

Biehler, Robert F. Psychology Applied to Teaching. New York: Houghton Mifflin Company, 1971.

Bonney, Merl E. and Hampleman, Richard S. Personal-Social Evaluation Techniques. Washington, D.C.: The Center for Applied Research in Education, Inc., 1962.

Chase, Clinton I. Measurement for Educational Evaluation. Reading, Massachusetts: Addison-Wesley Publishing Company, 1974.

Dressel, Paul L. "Measurement and Evaluation of Instructional Objectives," Seventeenth Yearbook of the National Council on Measurements Used in Education. New York: N.C.M.E., 1960, pp. 1-6.

Ebel, Robert L. Essentials of Educational Measurement. Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1972.

Gronlund, Norman E. Measurement and Evaluation in Teaching, Second Edition. New York: The Macmillan Company, 1971.

Jarolimek, John. Social Studies in Elementary Education. New York: The Macmillan Company, 1967, p. 491.

Lien, Arnold J. Measurement and Evaluation of Learning. Dubuque, Iowa: Wm. C. Brown Company Publishers, 1967.

Maley, Donald. The Maryland Plan. New York: Benziger, Bruce and Glencoe, Inc., 1973.

Micheels, William J. and Karnes, M. Ray. Measuring Educational Achievement. New YOrk: McGraw-Hill Book Company, Inc., 1950.

Musgrove, G. Ray. The Grading Game: A Public School Fiasco. New York: Vantage Press, 1970.

Nunnally, Jim C. Educational Measurement and Evaluation, Second Edition. New York: McGraw-Hill Book Company, 1972.

Payne, David A. The Specification and Measurement of Learning Outcomes. Waltham, Massachusetts: Blaisdell Publishing Company, 1968.